Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

VOLUME IX.] NEW-YORK MARCH 11, 1854. [NUMBER 26.

THE SCIENTIFIC AMERICAN,
PUBLISHED WEEKLY,
At 128 Fulton street, N. Y. (Sun Buildings.)
BY MUNN & CO.
Agents.

Federhen & Co., Boston.	Dexter & Bro. New York
Stokes & Bro., Philadelphia.	B. Dawson, Montreal, C.E
Cook, Kinney & Co., San Francisco.	M. Boullemet, Mobile, Ala
	E. W. Wiley, New Orleans
Le Count & Strong, San Fran.	F. G. Fuller, Halifax, N. S
Avery Bellford & Co., London	M.M.Gardissal & Co. Paris
S. G. Courtenay, Charleston,	S.W. Pease, Cincinnati, O

Responsible Agents may also be found in all the principal cities and towns in the United States.

TERMS—$2 a-year :—$1 in advance and the remainder in six months.

Improvement in Sawing Machinery.

We herewith present two illustrations of an improvement in sawing machinery, on which application for a patent has been recently made by John Meyers, and Robert G. Eunson, a notice of which appeared in our columns last week.

Fig. 1 is a perspective view, and fig. 2 a plan, the same letters referring to corresponding parts.

A is the frame which may be constructed in any proper manner; B is a shaft running transversely across the front part of the frame, on which shaft is placed a circular saw, C, formed of thin steel plate, such as is used for sawing veneers, on one side of the saw a circular plate, D, is secured by rivets or screws, *a a*, the plate being somewhat less in diameter than the saw. This plate stiffens the saw and without its use, a comparatively much thicker saw would be required.

Two deflecting plates are placed one at each side of the saw, one of which covers the upper part of the stiffening plate, D, the inner end does not project outward from the saw, C, quite as far as the outer end. The other deflecting plate on the opposite side of the saw, is rather smaller in diameter than this one, and projects from the saw at about an equal distance at both ends; F, F, are two feed roller beds placed vertically in the back part of the frame, A, and parallel with each other. Both of these beds are made adjustable by means of screw rods, *b*, which bear against the sides of the beds, the screw rods of each bed being operated simultaneously by means of chains, *c*, passing around small toothed wheels, *d*, at the ends of the screw rods; G G are cranks, one of which is attached to one of the toothed wheels, *d*, of each bed. The beds also have a lateral elasticity given them, by means of india rubber or other springs attached to them in any proper manner; H H are feed rollers placed in the beds, F F, two rollers in each bed. They project some distance beyond the inner edges of the beds; I I are clamps attached to the inner ends of the beds, F F. At the back part of each clamp there are two journals, *e e*, one at the top and one at the bottom. These journals fit in boxes, *f f*, which work or slide in recesses in the top and bottom pieces of the beds; J J are set screws which pass transversely through the top and bottom pieces of each bed. The inner ends of these set screws bear against india rubber springs, *g*, which are placed directly back of the boxes as shown.

K K are india rubber springs at the top of the clamps, which are placed between them and set screws, L L, which pass transversely through the top pieces of the beds, F F; M M are stops which pass through the top pieces of the beds, one through each top piece. The stops regulate the distance of the lateral vibration of the clamps; O O are knives or cutters placed vertically in the beds, F F—one knife or cutter in each bed. The top and bottom of the cutters are fitted in slides, *h h*, which fit in the top and bottom pieces of the beds and are regulated by set screws, P P. The cutting edges of the knives or cutters are on a line with the edges of the feed rollers, H. Motion is given the rollers by proper gearing, R, at the lower part of the rollers. The beds, F F, are adjusted relatively to the saw, C, so that the stuff may be sawed into the desired thickness. Either side of the saw may be made the "line side" by fixing permanently or destroying the elasticity of the proper soler bed. The stuff, S, is placed between the feed rollers, H, in the beds, F F, and motion being communicated to the saw and feed rollers, the stuff is fed towards the saw and cut by it, the two pieces being prevented from bearing against the sides of the saw by means of the deflecting plates. When the outer end of the stuff has passed the innermost feed rollers, the clamps, I I, bear against and hold it in a proper relative position to the saw. A fresh piece of stuff is now placed between the feed rollers, the latter piece of stuff forcing forwards the preceding piece. If the last piece is rather thicker than the preceding one, it merely acts upon the beds and forces the elastic one further from the permanent one, without affecting the clamps, which have an independent elasticity owing to the springs, *g*, K. The knives or cutters, O O, cut or smooth off to an equal thickness, the extreme ends of the stuff which is split and not sawed, the usual practice in saw mills.

We will suppose that the stuff, S, is two inches in thickness, and it is desired to saw it into two strips, one of which is to be one quarter inch in thickness. The one quarter inch strip being the thinnest may be deflected by the plate, E, as it is inclined or projects outward from the saw further than the plate E'. The roller bed in line with the deflecting plate, E, is permanently fixed at one-quarter of an inch from the side of the saw, the opposite bed being elastic. The side of the saw on which the thin strip passes is the "line side." The opposite of the saw may be made the line side by permanently fixing the opposite roller bed, and allowing the other one to remain elastic.

EUNSON'S SAWING MACHINE.---Fig. 1.

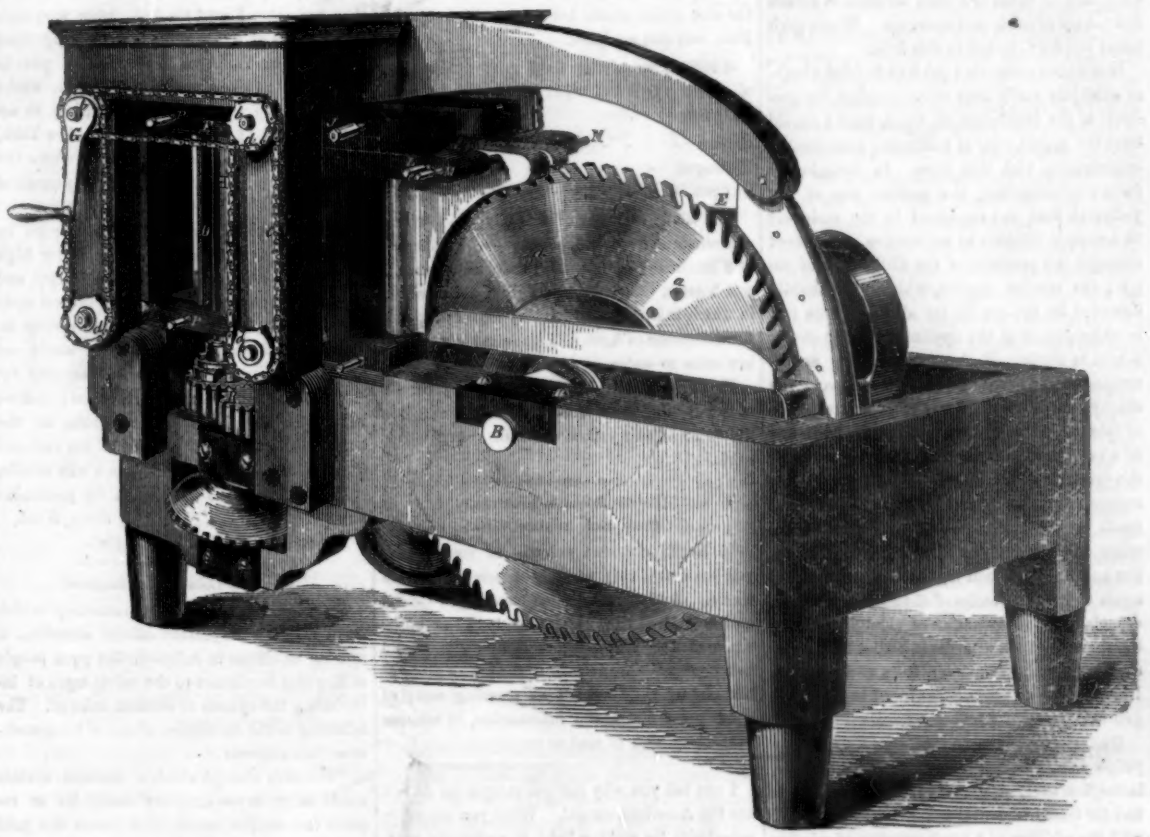
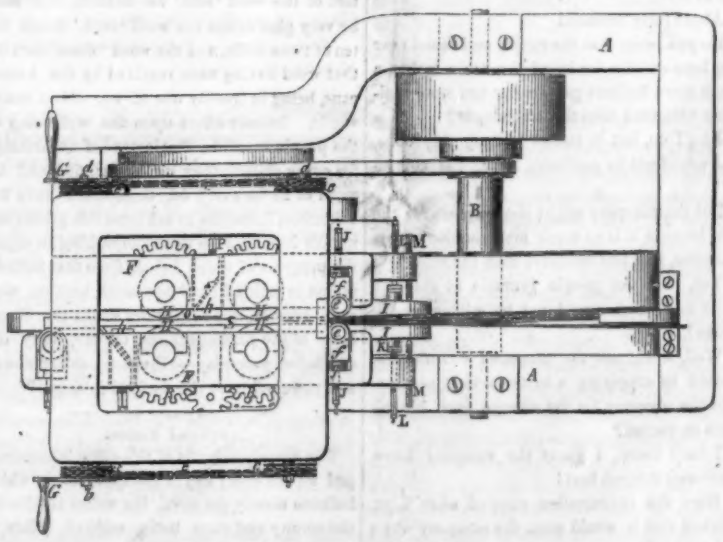


Figure 2.



New Galvanic Power, for Propelling Ships.

After a while we shall cross the ocean quick enough to make London a suburb of New York. Many ingenious savans are at work devising new and more rapid means for propelling ships. Among the rest, a French physician is now in Liverpool, for the purpose of applying galvanism to the propulsion of ships. The discovery of the doctor consists in lining the vessel with zinc and copper, according to a given plan, and in forming, by them, an immense series of galvanic piles, or batteries, of which the liquid electro-motor shall be the salt water of the sea. The immense battery acts upon the electro magnets, of which the movement of attraction and repulsion much surpasses, it is said, the force of our greatest steam engines.—[Exchange.

[We do not see a single new feature in the above plan. The power of electro magnetism to propel machinery is not new, and the proposal to convert the lower part of the interior of a ship, into a huge galvanic trough is also not new. On page 211. vol. 2 Glasgow Mechanics "Magazine," published 1825, a correspondent proposes the same plan. He says the vessel to be propelled, is to be converted under the flooring into one great galvanic trough, or furnished with a series of smaller ones, and I propose to charge the troughs with sea water to save the expense of acid."

For the want of a knowledge of what other inventors have done, many old inventions are reinvented every year. It cannot be otherwise. There are few who have had the opportunity, from experience and study, of becoming well acquainted with the history of inventions.

The use of Grapes, as an article of food, is much recommended in case of consumption.—They contain a large quantity of grape sugar, the kind which most resembles milk sugar in its character and composition.

Aldehyde in the Distillation of Sugar.

The annexed interesting article is by Prof. Volckel, of Germany, and is selected from the Annals of Chemistry and Pharmacy:—

"In my memoir upon the products of the distillation of sugar, a volatile fluid is described under the name of "yellowish fluid;" it is the first that comes over during the distillation of sugar-vinegar, begins to boil at 86° Fah., and distils over for the most part between 140° and 149° Fah. Closer investigation showed that this fluid contained acetone, a volatile yellow-colored oil, and very probably aldehyde. The latter betrayed itself by its characteristic odor, and its behaviour with solution of potash and nitrate of silver and ammonia. Wood-spirit could not be detected in this fluid.

In the above memoir I left it undecided whether aldehyde really does occur amongst the products of the distillation of wood, until I should have the opportunity of instituting some further experiments with this view. In fact, in my former investigation, the greater part of the yellowish fluid was employed in the endeavor to ascertain whether or no wood-spirit occurred amongst the products of the distillation of sugar; the smaller portion, which was specially intended for the search for aldehyde, was lost in consequence of the application of too strong a heat in driving off the water, during an attempted separation of the acetone from the aldehyde by means of finely-powdered chloride of calcium. The positive proof of the existence of a very small quantity of aldehyde amongst the products of the distillation of sugar did not appear to me, at that time, when I was still much occupied with the investigation of the other products of the dry distillation of sugar and wood, of such importance that I should again undertake a series of distillations of sugar, especially as the formation of aldehyde during the decomposition of organic bodies had already been demonstrated by Hess and Scanlan. I have however, since endeavored to fill up this gap in my previous investigations.

During the distillation of sugar vinegar, a yellow fluid, of penetrating aldehyde-like odor, is the first thing to pass over. This was rectified for further examination on the water-bath, with the addition of a small quantity of solution of carbonate of soda to neutralize any adherent acids; it was then deprived of water by chloride of calcium, and distilled, the matter first passing over being especially collected. This fluid has still a slight tinge of yellow. It mixes in all proportions with anhydrous ether. If this mixture be saturated with anhydrous ammoniacal gas, colorless crystals are produced in a short time, possessing all the properties of aldehyde-ammonia. Not the smallest doubt therefore can exist that aldehyde is formed during the distillation of sugar, although in very small quantity.

Aldehyde is also certainly present in small quantity in the products of the distillation of wood, and is perhaps the cause that wood-spirit, which has been freed by distillation upon lime from those oils, such as furfurole, which are volatilized with difficulty, and by these means rendered colorless, again acquires a color, and deposits a brown substance when caustic potash is dissolved in it.

The occurrence of a small quantity of formic acid in sugar-vinegar is probably intimately connected with the formation of aldehydes during the distillation of sugar. Thus both together contain the same equivalents of hydrogen and oxygen:—

1 equiv. aldehyde - - - - - -	$=C^4 H^4 O^2$
1 equiv. hydrate formic acid - -	$=C^2 H^2 O^4$
	$H^6 H^6 H^6$

The simultaneous formation of aldehyde and formic acid by the exposure of sugar to heat may therefore be as readily understood as the formation of the hydrates of carbon, acetic acid, assamar and furfurole.

The yellow color of the fluid passing over at 149° Fah., which both according to the previous and present investigations consists essentially of acetone and aldehyde, arises from the presence of yellow, volatile, readily-changeable oils, which distil over principally between 176° and 320° Fah., and possesses a different constitution from furfurole.

These oils are produced only in very smal quantity in the distillation of sugar. They polsess a strong penetrating odor, and are converted into brown substances, which are only sparingly soluble in potash, by the action of alkalies, or even of their carbonates. The true constitution of these volatile oils could not be ascertained, as the small quantity in which they were obtained admitted of no further separation.

In my previous investigation, only that portion of them which passed over between 284° and 302° Fah., which however is always much contaminated with furfurole, whose boiling point is 324° Fah., was submitted to analysis. In the present case, that portion of these volatile oils which distils between 176° and 212° Fah., was also analyzed.

0·2085 grm. of this fluid gave 0·479 grm. of carbonic acid and 0·182 grm. of water. In 100 parts—

Carbon - - - - - - - - - - - -	62·72
Hydrogen - - - - - - - - - - -	9·69
Oxygen - - - - - - - - - - -	27·59

The whole quantity of this oily fluid, which was obtained from the products of distillation of 8 lbs. of sugar, amounted only to between 2 and 3 grms. The fluid is lighter than water, in which it is tolerably soluble, especially with the assistance of heat. It communicates a yellow color to water.

This oily fluid is also present in the products of the distillation of wood; with furfurole it is the cause of the yellow color of crude wood-spirit.

[For the Scientific American.]

Pure and Impure Gas.

In No. 24, present volume, of your paper, you gave us a very sensible article under the above. And in conclusion you say "cannel coal being free from sulphurets, is to be preferred for making gas, and if *our* gas companies do not now use the American cannel in place of bituminous they exhibit an amazing want of good sense and sound information, in relation to the best kind of coal to employ in their business."

I can tell you why *our* gas companies do not use the American cannel. What you say of its superiority for making light is eminently true. It contains much more hydro-carbon vapor and olefiant gas than the bituminous coal. Now the reason it is not used instead of the bituminous, I would perhaps best convey by giving a short conversation that took place last summer between the working superintendent of a western gas company and myself; to wit:

"What kind of coal do you use here for making gas?

Why, bituminous coal!

What do you pay for it per bushel?

Four and a half cents!

What do you get for coke per bushel?

Five cents.

How many bushels of coke will thirty bushels of bituminous coal leave after the gas is roasted out of it?

About forty bushels!

Do you know that the cannel coal found near you here on the banks of the Ohio makes a much more brilliant gas—easier and more copiously extracted than the bituminous?

Yes, I do, but it makes *scarcely any* coke, and would not be profitable to the gas company!

But the company might charge more for the gas, because it is so much more luminous, less offensive, and less corrosive than the other?

Yes, but the people grumble at the high price now, and would not be willing to advance!

Well, would not the increased consumption caused by supplying a better article remunerate the company for the change from bituminous to cannel?

I don't know, I guess the company know their own interest best!

Here the conversation stopped after I remarked that it would seem the company was a coke manufacturing concern instead of a gas-lighting company, inasmuch as the light was but the secondary consideration of their operations.

This is plainly the reason why *our* companies do not use the American cannel. It is rich in hydro-carbon vapor, and olefiant matter, but leaves no coke.

I still think your concluding remarks are right. If the gas companies were not too rapacious after big dividends to see the advantages they must ultimately derive from the increased consumption of a superior light, they would use the cannel altogether. In your city they use two-thirds cannel and one-third New-Castle, the light of which is superior, especially in proportion to the quantity of gas consumed, to any made from bituminous in the United States. This was the case in June last. Its specific gravity then was full 550, atmosphere being 1,000, which is considerable heavier than any other I used for ballooning purposes. In a balloon of 9,000 cubic feet capacity filled with the New York gas, it weighed 65 pounds more than the same quantity did from works using bituminous coal, I had therefore to ascend with but 15 pounds of ballast at New York, while at Zanesville and other places where the bituminous coal was used, I took 80 pounds of ballast.

The sulphurous and ammoniacal vapors issuing from gas burners, especially under high pressures, are very corrosive upon jewelry, and very destructive upon books, and indeed upon all fine textile fabrics. They are also very injurious to weak lungs. These evils would not exist if the American cannel coal was used for gas, with ordinary care of purification; and we have it in abundance, and so pure, on the banks of the Ohio, that a splint of the raw coal burns with a flame as brilliant as a wax candle, specimens of which I have in my possession now.

JOHN WISE.

Lancaster, Pa., Feb. 27th, 1854.

Decimal Coinage in England.

Dr. Bowring, on the eve of returning to China to hold an important official situation, is sparing no efforts to enlighten the good people of England in relation to the advantages of introducing the system of decimal coinage. The following is the conclusion of one of his speeches on this subject:

"The only change which a decimal system would effect in our currency would be as regards the copper coinage; it leaves the gold and silver untouched. I would take the pound sterling as the integer, as I feel the advantage of recognising a point of departure which is consecrated by the earliest records of this country, and which existed long before the conquest, as the groundwork of all accounts; this course having been adopted by every country which has yet adopted the decimal system. I therefore come to the conclusion that to leave the pound sterling untouched, and only operate upon the copper currency, is the true and intelligible, and commercial, and philosophical system. I propose that the pound should be divided into a thousand parts, and as far as regards names, that the names given should represent the value.

I shall be very glad to suggest the substitution of the word 'mill' for farthing, and shall be very glad to see the word 'cent' taken for ten of these mills, and the word 'dime' for 100, that word having been received by the Americans, being in reality one of our oldest Saxon words. Its only effect upon the well-being of the people would be that instead of 48 farthings for every shilling they would get, 50, and instead of 24 for every 6d, they would have 25. Therefore, I venture to ask from this great community its assistance in accomplishing an object the progress of which I shall, from that farthest region in which I shall be placed, look on with great interest, and respecting which the Chancellor of the Exchequer said to me, only the day before yesterday—'Prepare public opinion, and you shall have the decimal coinage.'"

Special Notice.

The correspondence of this office is immense, and we are every day in receipt of letters which indicate merely the town the writer resides in, the county and state being omitted. This is very annoying, and we earnestly solicit those who write us in future to give not only their own names but also the name of the town, county, and State, to which they desire their letters to be addressed. This insures a prompt reply, and saves us from a perplexing annoyance.

Combustion and Evaporating Power of Boilers.

MESSRS. EDITORS.—Permit me to propound through the columns of the "Scientific American," the following question, which is of considerable importance to the engineering world:—

If a given quantity of carbon, and an equivalent quantity of oxygen combine together at a low temperature, say 1000 degrees, will the amount of heat thus produced be the same as if the carbon and oxygen were combined at a temperature of 2000 degrees, the carbonic acid the result of the combustion weighing the same in both cases? Will not the temperature of the carbonic acid in the latter case be double that of the former.

For example, if I have two boilers of the same construction and size, with the exception that the fire space of one is twice as large as that of the other, the larger using natural draught, and the smaller a blast, both boilers evaporating an equal weight of water in a given time, will the evaporating power of a given quantity of coal be the same in both boilers.

A. K. R.

New York March, 1st. 1854.

[The *quantity* of heat produced by the perfect combustion of coal is the same, whether the combination of the carbon with the oxygen to produce carbonic acid, takes place under a high or low degree of heat. The great object in the combustion of fuel under boilers is to make the water absorb the greatest amount of the heat generated by combustion in the shortest possible time. The example presented for solution is not one that will lead to any satisfactory result. The great question is, what is the proper amount of fire space and heating surface to absorb the greatest amount of the heat in a given time, under any condition. One boiler may have a fire space ten times larger than another of the same size, and yet not generate as much steam in a given time from the same quantity of fuel. To generate steam fast, the heat must be intense; this is the reason why a blast is necessary in locomotives.

The Fast Line.

An intelligent German mechanic, of this city, has authorized John S. Selby, the actuary of the Maryland Institute, to obtain for him a sufficient space in the Crystal Palace Exhibition, at New York, for the display of a steam power, which he will prove to be capable of propelling a vessel across the ocean in thirty-six hours. The actuary has complied with his request.—[Baltimore Sun.

MESSRS. EDITORS.—The above appeared in the Boston "Star Spangled Banner," in March 26, 1853. Can you give me any information respecting it; by so doing you will oblige

Yours, J. B.

[All nonsense, sir. It would require a vessel to move with an average velocity of 83⅓ miles per hour to cross the ocean from New York to Liverpool in thirty-six hours. Those wonderful inventions which are so often heralded in some of our papers, cannot be trusted. We never saw the engine or apparatus referred to, in the Crystal Palace.

Marine Locomotives.

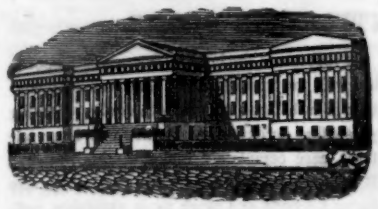
Since we published an illustrated description of Mr. Frost's Marine Locomotive on page 180, we have received quite a number of communications from correspondents on the subject, the majority of them condemning the project as impracticable, and some presenting plans of their own, which they consider far superior. Every inventor naturally thinks a great deal of his own invention, and cannot view it in the same light as a person who has no personal interest in the matter. We have expressed no views favorable to Mr. Frost's project, because we could not do so upon any Scientific or engineering principle whatever.

Steam Fire Engine.

A Committee of gentlemen, from Louisville, Ky., appointed to examine and report on the working of the Cincinnati Fire Engine, after having witnessed its performance, determined to recommend one of such engines for Louisville.

Notice—Water Wheels.

We shall next week commence to publish a series of articles on Re-action Water Wheels, which will contain much practical information.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING FEBRUARY 28, 1854.

SCYTHE FASTENINGS—S. B. Batchelor, of Lowville, N.Y.: I claim the continuous rectangular slot or opening, in combination with the ring and screw, by which I am enabled to attach any common scythe to my snath, as set forth.

[This is a simple and useful device.]

MACHINE FOR SPLITTING HOOPS—J. W. Chittenden & Wm. C. Mead, of Vevay, Ind.: We claim the feed rollers, the griping anvil, and bending rollers, or their equivalents, arranged and constructed as described, in combination with a trip hammer, as described, for the purpose of racking or splitting apart timber, (previously checked) for hoops.

SALT KILNS—John P. Conger, of Newark, N. J.: I am aware that tubes have been used for the purpose of heating water for other purposes; therefore I do not claim the invention of tubes, but the application of them to the making of salt, I believe has never been made before, and by means of my new kiln, I am able to make more in any given time, and with a vast deal less amount of fuel.

I claim the arrangement of a salt kiln having two small fires with short arches over the grates at each end, and the flues thereof meeting in the middle of the kiln, and passing into tubes leading through the feed trough placed immediately above and along the kiln, as set forth.

SEED PLANTERS.—Lewis W. Colver, of Louisville, Kentucky: I claim the combination of the loosely hinged stocks, with their teeth, shoes, and a seeding ap paratus, as described, and for the purpose of mellowing the soil, opening the furrows, dropping and covering the seed at one operation, as set forth.

CHURNS—R. W. Davis, of Rodgersville, N. Y.: I claim the manner described, of dividing the end pieces, and hanging them eccentric to the axis of the dasher in combination with the arrangement of the blades, so that the dasher may be adjusted by the resistance of the cream in revolving through it, so as to present six centripetal cutting or agitating blades to the cream, and then after the butter is produced to be adjusted by reversing the motion of the dasher, and through the resistance of the butter, so as to present but two centrifugal gathering blades for gathering the butter, working it into rolls, and expelling the buttermilk therefrom, as described.

[This is a good improvement.]

MACHINE FOR PULVERIZING ORES—A. K. Eaton, of New York City: I claim a rotating dish or mortar to hold the ore to be pulverized, and the water, mercury, or other liquids with which it may be advisable to mix the same, in combination with a vibrating rubber or pestle, which is made to traverse the bottom of the mortar, as set forth.

SNOW PLOWS FOR RAILROADS—Abijah Hall & Sylvanus Sturtevant, of South Paris, Me.: We claim so shaping, proportioning, and placing the notched shares of the snow plow that they will extend down within the inner sides of the rails nearly to the cross ties, without coming in contact with the chairs, for the purpose of removing snow and ice from the immediate vicinity of the inner sides of the rails, and by means of their mould-boards, discharging the same at a proper distance outside of the rails, substantially in the manner herein set forth.

DIES FOR MAKING SEAMLESS METAL TUBES.—Timothy D. Jackson, of New York City: I claim a die for drawing seamless metal tubes, constructed with an eye, whose periphery is formed of a series of narrow friction rolls, which produce a substantially equable extension of every part of the circumference of the tube being drawn, as set forth.

QUARTZ CRUSHERS.—Smith W. Bullock, of New York City, (assignor to Stillman, Allen, & Co., of same place): I claim the application of gear wheels solely for the purpose of causing the crushing wheels to turn on their axis faster (or make more revolutions) than they otherwise would in rolling around in the trough, the point of contact, (or pitch line) of said gear wheels being on a line drawn from their common center to a point upon the crushing wheels within its outer diameter (or periphery) thereby giving the periphery a slip or sliding motion upon the quartz.

RAILROAD CHAIR MACHINES.—Michael M. Gray, of Philadelphia, Pa.: I claim operating the sliding former or mandrel upon the base or pedestal, to keep it firm and cool, and cutting, curling, and swedging the plates of metal to be formed into the chairs while in a stationary position, and at a proper heat, on the top of this sliding former, instantly in the manner and by the means as described, to produce the chairs uniform in shape and cheaply, of low priced or red short iron without fracture.

SEED PLANTERS.—Thomas D. Henson, & George Rohr, of Charleston, Va.: We claim the construction, use, and application of a revolving longitudinal shaft, having series of right and left or double obliquely set beaters, and cleaning spikes for the purpose as specified.

FUSIBLE DISCS IN STEAM BOILERS.—Wm. Burnett, and John Absterdam, of Boston, Mass.: We claim placing in a pipe which is connected with a steam boiler a fusible plug or disc, said plug or disc being so far removed from said boiler, but so connected with the water therein that when the water is sufficiently high, the plug or disc will be in contact, or so surrounded with water cooler than that in the boiler as to prevent it from being fused, but when the water in the boiler shall fall below a proper hight, the steam will enter, and come in contact with said plug, or so surround it as to cause it to melt, the same being for the purpose specified.

ZINC WHITE FURNACES.—James Renton, of Newark, N. J.: I do not claim to have invented any mode of treating the oxyds or other substances, after they are evaporated, but I claim, 1st. The combination of any number of ore tubes and spaces, placed side by side, and communicating with each other through openings in their sides, the ore tubes being exposed to a degree of heat sufficient to evaporate the oxyds, or other substances contained therein, and make them pass through the openings into the spaces, the said spaces being protected from the heat by the ore tubes, and serving either to collect and condense the oxyds or other vapors, or to convey them to any other suitable receptacle substantially as set forth.

2nd. The hood or trunk furnished with suitable openings for the admission of air, and placed over the ore tubes, F, and tubes or spaces, M, substantially as described, for the purpose of receiving, leading off, and cooling the oxyds, or other vapors escaping from the ores, as described.

[If we mistake not this is a very useful improvement made by the inventor of the wrought-iron furnace, illustrated in No. 22 of this volume.]

TABLE TO HOLD BANK NOTES WHEN CUT—F. G. Johnson, of Brooklyn, N. Y.: I do not claim the movable cutting board, neither do I claim the depressable needle screws, but I claim the combination with a table of the movable cutting board, and the depressable needle screws, combined together as specified, for the purpose of cutting bank notes.

AIR ENGINES—A. S. Lyman, of New York City: I claim first, the mode of preventing the waste of the compressed air, liquid carbonic acid, or other driving power by interposing between it and the outer cylinder of the engine, a reservoir of water or other suitable liquid, as described.

Second, I claim the mode of applying the heat to the generating power through the agency of water or other liquid, as specified, thus avoiding the possibility of burning and scaling the metal, and also greatly increasing the extent of heating surface.

Third, I claim the mode of preventing the loss of power otherwise caused by the expansion of the air, liquid carbonic acid, or other driving power, in passing through the repository and refrigerator, and being cooled and condensed before the working piston has completed its stroke, in the manner described, that is, by moving the generating plunger downwards, as the working piston recedes from it, thus enlarging the heating chamber, as fast as the air or other fluid expands.

Fourth, I claim the combination of the generating cylinders with the opposite ends of the working cylinder direct, thus dispensing with contracted passages and pipes, causing the piston to move as rapidly as the working fluid moves.

Fifth, I claim the construction of the heat repositories and restorers of small glass tubes or glass rods, arranged as specified.

Sixth, I claim the combination of the heater, the repository and the cooler, as described, the heater being above the repository, and the cooler below it, so that as the heat rises, it does not tend to destroy the effect of the repository, but rather renders it more perfect.

Seventh, I claim the partial isolation or separation of the upper part of the outer case, containing the heating liquid from the lower part containing the cooling liquid, by the introduction of bad conducting material between them.

Eighth, I claim the combination of the external heater with the internal heater, and the combination of the external refrigerator, as set forth.

[This is a very ingenious invention, and we are somewhat curious to see it tested. The inventor is sanguine of success; we shall see how far his hopes are to be realized; surely he is treading on delicate ground. Foreign patents are in progress through our Agency.]

MACHINES FOR MAKING BED PINS.—Wm. McBride, of Bristolville, Ohio: I claim attaching to a common turning lathe a sliding cutter stock, and providing such stock with two peculiarly shaped cutters, one stationary and the other movable, the stationary cutter being of such shape that it forms the tapering part of the pin, while the movable cutter is of a proper shape and construction to form a round head on the pin, and simultaneous therewith cut off the pin from the block ready for being discharged, as described.

I also claim making all the pins of a set, of a uniform length by employing a spring plug or gauge, as described, and by the same means effecting their discharge, after having been turned, headed, and cut off, as described.

[A notice of this invention is published on page 28 of this Vol Sci. Am.]

COTTON PICKER CYLINDERS—James Pitts, of Lancaster, Mass.: I claim constructing the screen so that the periphery of the metal intervening between any two immediately adjacent orifices shall be of a length equal to or greater than that of the staple of cotton or other fibrous material to be picked, in order that the fiber shall not lap around the said periphery and become connected, attached, or tied by its ends, as stated.

I also claim the improvement of constructing the cylinder screen of a hollow perforated metal cylinder without arms or ribs, and with open hollow cylindric journals at its two ends, as stated, in order that the cotton may be drawn out of one journal by the suction draught and any obstruction removed by a person's hand and arm introduced through the other journal, as specified.

SOCKET FOR BENCH HOOKS—Joseph Sawyer, of South Royalston, Mass.: I claim the improvement in the sockets of bench hooks, the hook being secured to the socket by the same screw and nut which fasten the whole to the bench.

ORGANS—Wm. Sumner, of Worcester, Mass.: I claim the employment of a wind chest having a main passage for the wind, and branches leading therefrom and governed by valves, as specified, and connected and combined with the keys, as specified.

I also claim, in combination with a wind chest operating on the plan, as described, the employment of auxiliary bellows, connected and combined with the main bellows and pedals, as described.

HARVESTERS—Solyman Bell, of Marseilles, Ill.: I claim the pins in the sickle, or their equivalents in combination with the scores in the guards, or their equivalents, so constructed and operated as to remove the leaves and stalks, and prevent the guards from becoming clogged, so as to obscruct the motion of the sickle.

TOOL REST FOR TURNING LATHES—Geo. A. Rollins, of Nashua, N. H.: I am aware that the tool post of a lathe has been fixed on a plate or platform that could be inclined by means of a screw, therefore I do not claim such.

I claim combining with the tool post and tool holder a separate rest block, in combination with making the said rest block and the post, respectively, with a convex and concave vertical bearing surfaces, the tool holder with a head or dovetail and the tool post with a curved trapezoidal or dovetail groove, as specified, whereby the cutting tool may not only set to any angle of inclination, but the said tool and rest simultaneously confined in position by the downward action of the screw of the tool holder, against the tool, as described.

SEED PLANTERS—John S. Snyder & Joseph Young, of Wheatfield Township, Pa.: We claim the sliding section in the bottom plate, in combination with the tubes and revolving perforated plate, as described, for rendering the machine capable of hill or drill planting at pleasure, and ensuring a regularity of deposit, as set forth.

I also claim the aperture in the frame, in combination with the inclined form of the plate, for carrying off the surplus grains, and collecting them in the bucket, as specified,

BANK LOCKS—Linus Yale, of Newport, N. Y.: I do not claim as new the pins, or the sliding shaft, or the covering, the key chamber with the broad head.

I claim them as arranged in connection with the cog, which prevents their being adjusted and turned by a burglar without the proper key.

CARRIER FOR LATHES—Jacob Zook, of Harrisburgh, Pa.: I claim the combination of the projections on the carrier plate, with the vibrating arms and eccentrics attached to the same pivots or their equivalents, situated and adjustable in, and combined with the auxilary disc and bar, arranged and operating substantially in the manner, and for the purpose herein set forth.

I also claim giving a limited elastic play longitudinally to the bar in the disc, by means of the slats and springs, or their equivalents, as herein described, in order that the pressure of the eccentrics againts the article to be turned may be equalized in case their bearing points should by tue irregularity or eccentricity of the article, be at uuequal distances from the ceuter of revolution which is determined and fixed by the conical point of the driving shaft.

VULCANIZING INDIA RUBBER AND OTHER GUMS—L. O. P. Meyer, of Newtown, Conn.: I claim the heating or curing of the material commonly known as the hard compound of vulcanized caoutchouc or other vulcanizable gums, by means of the immersion of the material in or under water or other suitable liquid during the process of heating or curing as herein described.

FORCEPS SAW-SETS—James F. Brodhead, of Rondout, N. Y. (assignor to Thomas Ritch, of Napanock, N. Y.): I claim the forceps saw-set, in the movable bed or anvil operating conjointly with the levers, euabling the operator to set the tooth of the saw from its point, instead of from its base, as is usual in other forceps sets, as herein set forth.

PRINTING PRESSES—Stephen P. Ruggles, of Boston, Mass.: I claim, first, in combination with the curved arm for carrying the inking rollers to and from the form, the spring plates with the guides at each end of the rollers for causing said rollers to pass over the form in a plane parallel to the form, their general motion being in the arc of a circle as described.

I also, claim hanging the platen and the intermediate ink roller to the same rock shaft by their respective arms, so that the vibration of the platen shall throw the intermediate roller first to the grooved ink rollers and then to the ink bearer, for the purpose of receiving and distributing the ink from the ink trough at every vibration of the platen as described.

ADDITIONAL IMPROVEMENT.

PLOWS—David Swarts, of Tonis Brook, Va.: Original Patent, dated June 22, 1852.: I claim and desire to have added to my letters Patent of June 22d, 1852, attaching the comb or rake to the rear end of the mould board by a crooked cam lever or bar swivel in combination with the hand lever, whereby it can be conveniently raised and lowered by rotating it upon its axis of connection as set forth.

RE-ISSUES.

CARDING BY WHICH VARIEGATED SLIVERS ARE PRODUCED. Jonas Holmes, and Ephraim French, of Lee, Mass.: Original Patent, dated May 18, 1852, we do not claim the making of doffing cylinders with strips or rings of card filling extending around them, and placed at intervals apart from each other, nor the using such in connection with a card cylinder, nor the giving of such doffers, when so used endwise motions, as such have been heretofore employed in the manufacture of roving of one color.

But we do claim as our mode of manufacturing variegated roving, or that composed of separate masses of fibrous material of different colors laid together, as described, our said mode being a combination of processes, which consist in feeding or disposing the fibrous material upon the main card cylinder in strands bands layers or masses of different colors, and so that they shall be disposed side by side of each other and around such cylinder, as specified, and removing such fibrous material from the said main cylinder, by a doffer or doffers, when constructed and made to operate therewith, as specified.

GRASS AND GRAIN CUTTING MACHINE—William F. Ketchum of Buffalo, N. Y.: Original Patent dated Feb. 10 1852, I claim, first, sustaining the outer end of the rack piece in the manner set forth.

The shield plate in combination with the shoe and cutter bar, for the purpose aforesaid.

DESIGNS.

CAST IRON LEGS FOR PIANOFORTES—Frederick Starr, of Rochester, N. Y.

CAST IRON PEDAL LYRE FOR PIANOFORTES—Frederick Starr, of Rochester, N. Y.

Recent Foreign Inventions.

MANUFACTURE OF SOAP.—P. A. Louniere of London, and L. M. DeMeckenhein of Birmingham, England, patentees. In this invention essential oils, obtained by distillation from schist or coal, wood, and turf, are employed as adulterants, by mixing them with the saponified matter; and pure pine-resin, that is, the juice of the pine from which turpentine is extracted, is employed in its native state, to form a saponified solution, by dissolving it in a concentrated lye, at a low temperature, to prevent the evaporation of the essential oil. This solution is added to, and mixed with soap and essential oils before the adulterations just mentioned are effected. Also, rice or potato starch may be used; being first converted into gelatine by mixing it with boiling lye. This is afterwards added to the soap as an adulterant.

AIR ENGINES.—Wrede Fabian, of Sweden, patented in England. In this engine, a mass of gas is moved backwards and forwards between two different chambers in such manner, that it does not undergo any change in its volume. During the transport from the one room to the other it is alternately heated and cooled, by which means its elasticity is alternately increased and diminished. This gas is in constant communication with the one end of a common working cylinder, on whose piston it will consequently exercise an alternately stronger and weaker pressure, and cause it to move backwards and forward in the same way as steam-engine pistons move.

This is opposition to the Ericsson, from a countryman of the Captain's; but he is too Fabian in name, and Fabian by nature, to astonish the world by such an invention.

STEEL PENS—J. Alexander, of Birmingham Eng., patentee. This invention has two objects, 1. Communicating magnetism to steel pens, for the purpose of diminishing the tendency to corrosion therein. 2. The construction of penholders, in which two metals capable of generating a voltaic current by contact with the moist hand are so placed, that on grasping the penholder in writing, they shall cause a voltaic current to pass through the hand of the writer.

SMELTING IRON—Wm. Ireland, of Leek Staffordshire, Eng., patentee. This invention consists—1. Of an improved method of feeding the furnace or cupola, by which any flame is prevented from appearing at or above the charging-door during the time of charging, and until the time of blowing down. This is accomplished by filling the furnace or cupola with fuel to about two feet above the tuyere, previous to putting in any metal, and by then arranging the pigs of metal, or portions of the same, one upon another, crosswise, so that all the ends shall face the tuyere, filling up the interstices so made with small parts of scrap metal and coke. 2. Of improved shape or construction of the furnace or cupola, in which it is made much higher than previously, and has a taper form on the inside above the contraction, to prevent the metal sticking or crusting to the sides. The contraction is also made of a peculiar shape, having a large space below it, so as to afford room for a very large quantity of fused or melted metal. If the said space be larger than is required, the inventor introduces a false bottom in segments, so that the parts can be put in through the mouth of the furnace. He introduces hot air by means of a common fan or blower, with suitable pipes and communications.

Central Africa.

The discovery, by Dr. Barth, of a magnificent river in Central Africa, named Benue, forming the upper course of the Chadda, tributary to but larger than the Kowara, commonly called the Niger, flowing through the most fertile and extensive kingdom of Adamana, has been followed up by intention on the part of the British government to send an expedition up the river, and a steam vessel, built for the express purpose, will be ready the ensuing month. The plan of the expedition is to arrive at the mouth of the Kowara (Niger) before the 1st of July, and to steam at once up the river with the waters. It is estimated that the kingdom of Adamana will be reached in three or four weeks after leaving the Bight of Benin. It is a well grounded opinion, if anything can open up the vast interior of Central Africa to European commerce, it will be the magnificent river discovered by Dr. Barth. The country is covered with splendid herbage, and is densely populated.—Ivory is in great abundance, and exceedingly cheap. Elephants are found in great numbers, and various articles of commerce largely exist. The chief articles of import are muskets, robes, glass, pearls and salt. The current medium of barter is narrow strips of coarse cotton, called gebbega. There is no desert to be passed over, as in Northern and South Africa, and the absence of these natural barriers to civilization and commerce render the probabilities of opening up an extensive trade with Central Africa not only practicable but comparatively easy.

Apples Without Seeds or Cores.

A correspondent of the Memphis "Whig" gives the following receipt for obtaining apples, without seeds and cores: Take the ends of the limbs of an apple tree, where they hang low, so as to reach the ground, dig a small hole for each end under the tree, bend it down and bury it in the hole, confining it down so that it will remain. Do this in the winter, or beginning of spring. The end of the limb thus buried will take root and put up sprouts of scion, which when they become sufficiently large to "set out dig up at the proper season, and transplant them in the orchard where you wish them to remain. When they get large enough to bear, they will bear apples as above.

The truth of the above statement is very easily tested, and we hope some of our readers will try it and furnish us with the result.

A Curious Dining Hall.

We learn from a London paper that Professor Owen was recently entertained at dinner in the garden of the Crystal Palace at Sydenham, in the model of an Iguanadon. The animal in whose mould the dinner was given was one of the former inhabitants of Sussex, several of his bones having been found near Horsham. His dimensions have been kept strictly within the limits of anatomical knowledge. The length from the snout to the end of the tail was 35 feet; he was 12 feet high; the circumference of his body was 35 feet, and the girth of his fore leg 6 feet 6 inches. Twenty-one gentlemen dined comfortably within the interior of the creature, and Professor Owen sat in his head as substitute for brains. The Iguanadon, it will be remembered, was a huge vegetarian monster, living upon the coarse rank herbage of the epoch which witnessed his existence, when no human beings existed on this fair globe.

Extension of the Telegraph System to Africa.

The Electric and Magnetic Telegraph system now used in Denmark, Holland, Austria, Prussia, Belgium, France, Switzerland, Italy, Spain, is to be extended to Africa. It is to be laid across the Mediterranean from Spezzia to Corsica, across Corsica, under the straits of Bonafacio, over to the island of Sardinia, again under the sea from Cape Suclada to Cape Bosas in Africa. By a decree bearing date the 15th ultimo, the French government threw open its African wires to the public.

New Inventions.

Feeding Printing Presses.

Henry E. Chapman of Albany, N. Y. has invented an apparatus for feeding paper to printing presses, on which he has applied for a patent. The invention consists in the use of a vibrating frame composed of a series of air tubes in combination with a series of fingers attached to the vibrating frame and moving with it, and also having a movement independent of the frame. The air tubes above mentioned communicate with a bellows or air pump, which operates as the frame vibrates and gives an alternate attractive and repelling surface to the ends of the several tubes of the frame, which in connection with the fingers convey the paper in single sheets to the press. The novelty consists in the combination of the fingers with the vibrating frame and air tubes.

Preparing Gold.

A. J. Watts of Utica, N. Y. has invented an improved process of preparing gold for Dental purposes, and others of a similar character. The nature of this invention consists in submitting spongy crystaline gold to certain degrees of heat, varying according to the spongy character of the specimens to be treated, whereby it is rendered adhesive, cohesive, and malleable, which enables it to accommodate itself to all the irregularities and cavities of the teeth. Application has been made for a patent.

Railroad Switches.

George Hancock of Providence, R. I. has invented an improved railroad switch, and has taken measures to secure a patent. This invention consists in the employment of a number of elastic and permanent rails attached to movable frogs so arranged that the cars while going in one direction may be switched on branch tracks at either side of the road, while cars moving in an opposite direction may pass over the switch on the main track, irrespective of the position of the switch.

Improved Wrench.

P. Smith of Bridgeport, Conn. has invented an improved wrench, on which an application has been made for a patent. The nature of the invention consist in having the lower jaw of the wrench stationary and secured to the handle by a hollow shaft, while the other jaw is made movable by a combination of a rack and pinion.

Ditching Machine.

John Lyon of Harrisburg, Iowa, has invented a machine for excavating earth and throwing it in embankments, on which application has been made for a patent. The machine is constructed with a plow, which enters the ground and elevating the earth throws it upon the endless conveyor moving at right angles to the line of draught. The claim is upon the general arrangement of parts.

Improved Slitting Gauge.

James Ballard, of Ashtabula, Ohio, has invented an improvement in gauges for slitting laths and like purposes, on which he has applied for a patent. The invention consists in making the gauge head in two sections with back stops and set screws, and uniting them together at their center, by a pin upon which they may turn freely, and the lower section adjust itself to a position in line with the edge of the board, thus preventing it from running off in cross grained wood.

Improved Lantern.

P. A. Morley, of Brooklyn, N. Y., has invented an improvement in Lanterns, on which he has taken measures to secure a patent. The improvement consists in making a lamp and lantern in one piece of glass, thus simplifying its construction and reducing its cost, as no fastenings are necessary for securing the oil reservoir to the lantern.

On account of the tremendous mortality by pulmonary consumption, it has been suggested that a distinct chair in some or all of the colleges, for the study of thoracic viscera, and the lungs in particular, in health and disease, would be of great benefit.

LYMAN'S APPARATUS FOR WARMING AND VENTILATING ROOMS.

In this apparatus heated air is circulated in the same manner as water in the common hot water apparatus, as the medium for diffusing the heat of the furnace through separate and more extensive radiatory surfaces.

These radiators constitute a chamber completely inclosing the furnace, and being air tight they do not permit any of the air that has been in contact with the furnace or its pipes, nor any of the products of combustion escaping from their joints, to pass up into the rooms.

From their position and extent the radiators are uniformly heated by hot air, so that the current of air passing along their outer surfaces for warming and ventilating is uninjured, having neither been in contact with highly heated surfaces, or mingled with noxious gases.

Figure 1 is a perspective view; figure 2 is a vertical cross section through the grate, and the brick chamber inclosing the heater; figure 3 is a vertical longitudinal section; figure 4 is a horizontal plan.

A represents the internal furnace corresponding with the furnace of the hot water apparatus; B is a large corrugated smoke chamber presenting an extensive surface; M is an air tight case completely inclosing this furnace; R is the corrugated top of this case, which also forms a second and much more extensive radiating surface; D is the door; *d* the damper.

When the fire is built in the furnace, the air in contact with it is heated and rises in the direction of the arrows, S S, figure 2, up among

Figure 1.

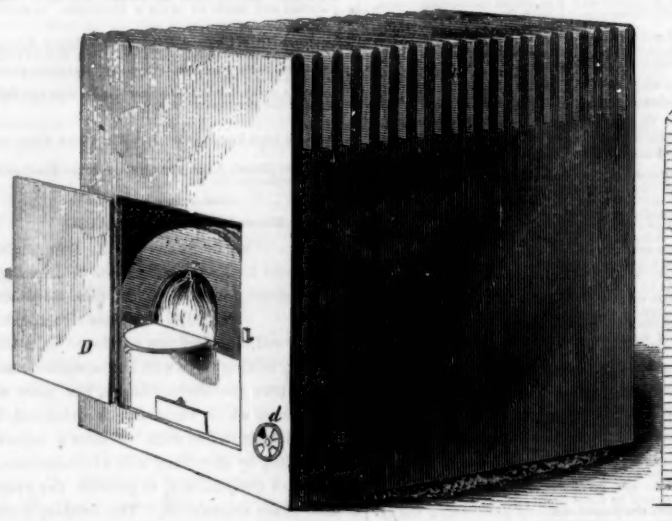
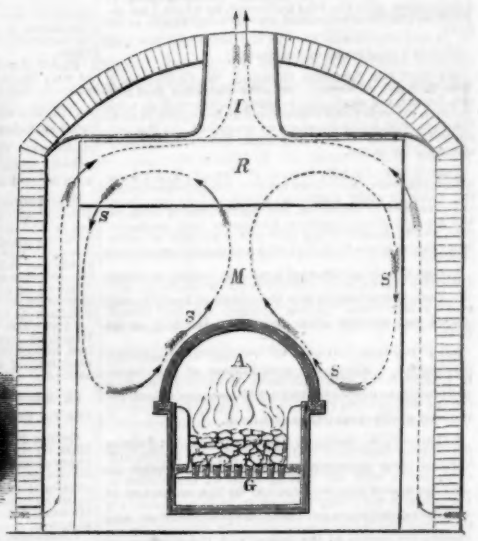


Figure 2.



the radiators, the colder air from the sides of the case flowing in to supply its place, and is in its turn rarified and rises, while the air among the radiators is cooled, becomes heavier, and flows down the sides of the case, and thus circulating currents of hot air are formed as represented by the arrows, S S.

These currents of heated air circulating between the furnace, A B, and the radiators, R, operate as the medium in the same manner as water for taking up the heat of the furnace and diffusing it through the separate radiators.

The internal furnace takes its draught entirely from the air being used as a circulating medium, and this medium is being constantly renewed by a supply through the damper, *d*.

Figure 3.

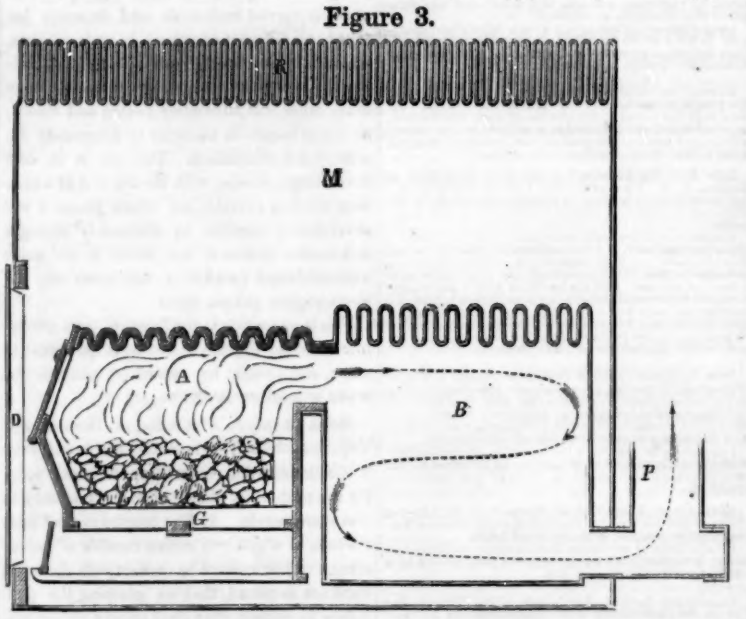
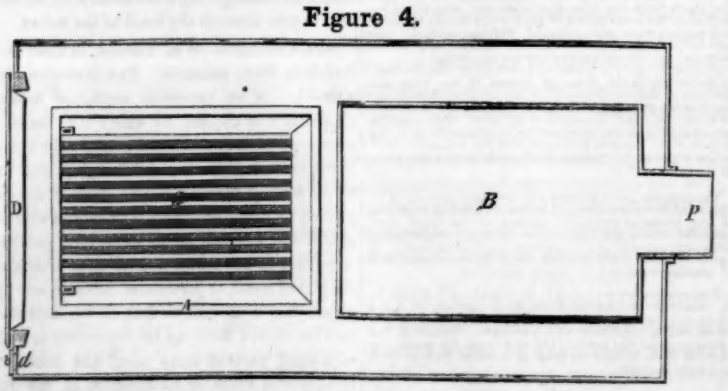


Figure 4.



Any gases that escape from the defects in the internal furnace mingle with the circulating medium and are finally drawn back into the furnace, and the scorched air being here used to support combustion is sent off the smoke pipe where it can do no harm.

The external circulation is the same as that of the hot water apparatus. The air among the radiators, R, being warmed, rises up the hot air pipe, I, and the cold air flows in at the bottom of the brick wall, up the sides of the case, and under the shield through the radiators.

It is well known that air warmed by ordinary naked hot air furnaces is more or less impaired as it is so over-heatedby the high temperature of some parts of the furnace as to be injurious to health.

The products of combustion escaping through the joints of the furnace into the rooms are inhaled by the occupants. This is not entirely owing to defects in the construction of, or accidents to furnaces, but in part to their peculiar situation. Placed in chambers of rarified air, from which proceed upward large flues having often a draught more powerful than that of the smoke pipe, and the supply of cold air being checked by adverse currents or eddy winds about the entrance of the cold air channel or by the valve being partly closed in this channel, while the draught under the grate is fully open, the pressure of the atmosphere often becomes greater in the furnace than in the rarified air chamber around it, consequently the products of combustion are forced through the joints of the furnace to supply the partial vacuum.

Again, every one knows that smoke and gas frequently escape from the joints of the common stove when the door is open, and also when the damper in the smoke pipe is shut. This is true to a much greater extent in the case of the furnace surrounded by a partial vacuum.

The frequent fires which have occurred from furnaces, have rendered the very word almost a terror to many housekeepers. They are far from being all alike dangerous, but very many of them are neither more safe nor economical than that styled by Dr. Ure, "an incendiary coal devourer." The powerful draught up the hot air pipes, and the partial vacuum in the chamber surrounding the furnace causes not only the gases to escape as above shown, but sometimes sparks of fire escape by the joints of the furnace, and passing up with the current through the register set fire to articles in the room, or glancing through the joints of the hot air pipe, more frequently set fire to the woodwork which between the partitions and under the floor is covered with a dry inflammable powder. This more surely results when from undiscovered flaws and expansion by heat, pieces of the furnace are broken out which is not unfrequently the case.

This apparatus has been in operation at the Novelty Works during the whole of the past winter and has within a few past weeks been ordered for several first class houses, among others the new Opera House, on 14th street, where a room 200 feet long, 120 wide, and 85 high is to be heated by it. Address the inventor, A. S. Lyman, at the Novelty Works, this city.

Scientific American.

NEW YORK, MARCH 11, 1854.

The Smithsonian Institute.

We know it is very easy to rail against any Institution, and to gain a kind of clap-trap popular applause, even when facts will not warrant it, by being sharp and severe in censuring; but we hope we shall never be guilty of seeking such ovations. What we have to say therefore, respecting the above named Institution springs only from a desire to do good in presenting our views respecting its management.

It is our opinion that if Smithson were to rise from the dead, his first object would be to try and get the funds he bequeathed to our nation "for the increase and diffusion of knowledge among men" removed from the guardianship of our government at Washington. Let us briefly recur to his bequest. James Smithson, an eminent chemist, and natural son of the Duke of Northumberland, died in 1826, and in his will made the following bequest in the event of the death of his nephew and heir, "I then bequeath the whole of my property to the United States of America, to found at Washington under the name of the Smithsonian Institution, an establishment for the *increase* and *diffusion of knowledge.*" In 1835 his nephew died, and in 1836 President Jackson selected Richard Rush, of Philadelphia, as the special agent of the United States to proceed to England and prosecute the bequest to its final recovery. This commission he faithfully and successfully executed, and on the first of September 1838, he deposited in gold at the Philadelphia mint, the sum of $508,318,46, being the proceeds then recovered of the bequest. More than thirteen years have since passed away, and what has been done to carry out the will of this lover of our country. Considering the donor, and the nature of the bequeathment, our government should have executed the bequest of Smithson with sacred and religious scrupulosity. But this has not been done, nor has a decent approach yet been made to do so. Our Congress wrongfully invested the money in the bonds of a few States, which for a number of years did not pay a single cent of capital or interest. For eight years after the money was obtained, not a stone was laid to found the Institution for which it was donated, and now since the structure has been erected and the institute organized by law, with guardians and officers appointed for its government, what has it done "for the increase and diffusion of knowledge among men?" Nothing to what it should have done. It is true that it has an able Secretary, Prof. Henry, and if we had been called upon to name the most suitable man in our country for this office, he would have been the one we should have selected; but the Institution is faulty, we think, in management. The object of Smithson was the increase and spread of the most useful knowledge among men—democratic knowledge—that which is elevating and beneficial, not that which involves mere learned curiosity,—the only kind for which the Institution has been most distinguished. As Smithson was a chemist, he no doubt desired to see a knowledge of that science spread abroad among men. What has the Smithsonian Institution done to promote the advancement of chemical knowledge among our people? Nothing. It was not until two weeks ago that we knew it had published any work on chemical science; this is a collection, a very useful one no doubt, but is composed mostly of extracts from foreign magazines. It has also published a number of abstract works on very unimportant subjects—which are of no general interest whatever. Everything connected with it seems to have been mismanaged,—the building is a grim distasteful pile, not creditable to the taste of the architect; and twice as much money was spent to erect it, as honor, common sense, and the objects for which it was originally designed, required.

We believe that the will of Smithson could be carried out in the best manner to pay nine or ten eminent professors—men of scientific reputation—liberal salaries, for the purposes purely of making experiments, searching after knowledge, giving a certain number of free lectures each season, then publishing the results of their experiments every year, in a cheap form for diffusion among the people. The American Academy of Arts and Sciences at Cambridge, Mass., a voluntary unendowed Association, does ten times more for science every year than the Smithsonian Institute. This should not be, and as the latter Institute is national, we speak in the name of the people, and request Congress to do its duty with respect to the will of Smithson, and endeavor hereafter to carry out his bequest in a liberal and honorable manner. The Smithsonian Institute has done a great deal of good since it was organized; this we cannot deny; we are glad to be able to say this, but it certainly should have done more, so far as it relates to popular useful science for the millions; that was the object of Smithson in making the bequest—he was a scientific democrat—or he, an English nobleman's son, never would have left his fortune to found such an Institution in republican America.

Composition of the Rings of Saturn.

The old saying, "doctors differ," is just as applicable to astronomers as to the sons of Esculapius. Any mysterious phenomenon, doubtful of ever being properly explained, always engages the attention of a host of speculative philosophers. And it is good that it is so; such subjects are loop holes for the imagination to gaze out from the circumscribed limits of plain demonstrable fact. The subject set forth in the caption of this article, has been and is a fruitful source of speculation in philosophy. In a communication to the "Franklin Journal," James Nasmyth, inventor of the steam hammer, and a good astronomer, presents reasons for supposing the planet Saturn to be yet in a molten state—the same state as our earth is supposed to have been in at one period of its history—and he considers that owing to its great mass, it has not yet become cool. He believes the rings of Saturn to be caused by the watery matter of that planet being converted into steam, from its great heat, and that the brilliant appearance of the edge of the ring is due to the reflection of light from fine particles of snow, formed from the steam being carried up to a great hight and then reduced to a low temperature.

The Cambridge astronomers, Prof. Bond, and Prof. Pierce, have published papers expressing their belief that Saturn's ring is composed of fluid matter. Prof. Daniel Kirkwood has also asserted his belief in Saturn's rings being matter in a state of fluidity, and that it is slowly solidifying. In a communication to Silliman's Journal on the subject, he says, "future astronomers may witness a scene no less amazing than the formation of a new world within the "limits of the solar system."

D. Vaughan, of Cincinnati has just published a pamphlet, in which he undertakes to prove that the rings of Saturn are the remains of two ancient satellites, which from "a resisting medium in space were consigned to destruction by bringing them too close to the primary body." "That the ring is not in a state of entire fluidity, is evident," he says, "from the fact that elevations and irregularities have been observed on its surface. These evidently arise from the concurrence of materials of so great a density that they could accumulate in defiance of the attraction of the central body."

It puzzles us even to imagine how two satellites could be reduced to minute fragments, and then remain in dust revolving round a primary. He offers no sensible proof whatever to us in favor of his theory. The rings of Saturn in our opinion are composed of vapor, and are not different from the cloud ring of our own planet described by Lieut. Maury. "This cloud ring," he says, "encircles our earth," and "were the clouds which overhang the belt of calms and rains luminous, (and by the theory of Nasmyth they would have such an appearance) and could they be seen by an observer from one of the planets, they would present an appearance to him not unlike the rings of Saturn do to us." This cloud ring is not due to the molten state of the earth, and Nasmyth may be right in his conclusions but not with regard to the cause, or certainly if Saturn's ring were caused by its great heat, Jupiter should also have a ring, it being the larger planet.

National Secret Documents.

There is certainly a great amount of immorality practised by our national officials, (or those connected with them) in respect to national documents which are held to be secret, and which should only come forth to the public direct from government itself. It oftentimes happens that a national document considered perfectly secret, appears flaming in some of our daily papers, to the no small mortification of some persons at Washington, and the no small glorification of the paper which receives the information, either by favor or for pay. We have seen the proof sheets of Commissioner Mason's Patent Office Report, for 1853, in the hands of persons who had no personal interest whatever in the matter; how they came to be possessed of them we cannot tell, but the fact is significant enough. If these papers are received of persons connected with the printing offices in Washington, they are not properly conducted, or such things would not occur. If a paper receives a national document legally in advance of all its cotemporaries it is but natural and right that it should publish it as early as it chooses, but a paper that pays persons at Washington for obtaining secret documents surreptitiously, is guilty of gross immorality. It may exhibit what some people call *smartness* and *enterprise*, but it is the smartness of the rogue and the enterprise of the gambler. And if this is so with respect to newspapers, it is doubly worse with regard to those who trade in such practices, to the dishonor of our nation and the disgrace of its national officers. The man who betrays trust is unfit to be employed in any public or private capacity. It would be well for the high officers of our government, if they looked more to character and less to party, in the selection of persons to fill subordinate offices.

Unalterable Bank Bills.

Since we published the advertisement offering a reward of $500 for an invention to render bank bills unalterable, we have received a great number of communications on the subject, one suggesting this, and another that plan, to prevent a bill of a lower from being altered to one of a higher denomination.

One gentleman, N. Young, of Lancaster, Ohio, recommends that all the banks in our country should issue *gauged bills*, that is to have every bill of a certain value measure so many inches long and so many broad, so as to have two exponents of the value of bills—one, the figures, the other, their size, This is a good idea, for if a two dollar bill was made of a size of 5×3 inches, and a twenty dollar bill of a size of $5\frac{1}{2} \times 3\frac{1}{2}$ inches, the former could not be altered to the size of the latter—from the lower to the higher denomination.

A number of other suggestions have been presented to us, but we have nothing to do with the business part of the question as presented through the advertisement referred to. We would merely state at present that the small sum of $500 as the offered reward, does not strike us very favorably respecting the liberality of the advertisers, considering the value of such a discovery to bankers. If the discovery is only worth $500, then its importance to our banking institutions is of no great consequence.

Purifying Black Lead for Pencils.

Runge proposes to purify poor black lead for pencils by digesting it in a state of fine powder for 36 hours, in about twice its weight of strong sulphuric acid, after which about four parts of water to one of the acid should be added and the whole then left to soak for half an hour.—The acid should then be poured off and the lead washed, when a pure black lead will be found at the bottom of the vessel—which should be of glass or stone ware. The decanted sulphuric acid contains iron and sulphate of alumina. Runge also proposes to add a little lamp black to the lead so obtained, in order to deepen the tints of the lines drawn by a pencil made from it. What are our our chemists doing about a jet black pencil, as a substitute for pen and ink.

Close of our Half Volume.

The present number completes the first half of the Ninth Volume of the SCIENTIFIC AMERICAN, and with it will expire the subscription of 7000 of our patrons. We have labored during the last half year to make our paper more emphatically than ever the first of its class in our own and indeed in any country, and we are confident that we can challenge the world to produce its equal for the price. It has been embellished with beautiful and costly engravings, and in this line we invite a comparison with our cotemporaries; our pages have presented a greater proportion of original matter than perhaps any other weekly in existence; indeed, our articles have been copied both in this country and Europe to an extent which no other paper can boast. In short, the "Scientific American" has become a necessity of the times,—a paper with which no mechanic or manufacturer can dispense, unless he chooses to be behind the times.

Our next half volume will be conducted with the same ability with the past. Indeed, "onward" will be our motto; and we shall not be content unless we find that at its close we have surpassed all that has preceded. No pains will be omitted, no money spared, to accomplish so desirable an end. We shall begin anew with our serial articles, so that each half volume will be complete in itself, and the present, therefore, will be a favorable opportunity for our friends while they are renewing their old subscriptions, to invite their neighbors to join them.

To show what our subscribe s think of us, we publish this week two more of the letters received from individuals to whom our prizes were awarded. We think few periodicals could present such an array of complimentary letters as we might, were it necessary. But enough for the present. Send on the money, with the satisfactory assurance that our increased income will be expended in improving your favorite paper until it shall be one as near perfection as we can attain.

MESSRS. MUNN & Co.—I had no intention of entering the lists as one of the competitors for the prizes, esteeming the pleasure of adding to the circulation of your useful and truly valuable paper sufficient reward. I have no doubt the list I sent you could easily have been doubled if I had had the time to attend to it.

As I am however one of the fortunate ones, I have concluded to divide the amount in three parcels, and would be obliged if you would procure the following magazines and have them directed and mailed, as below:

One copy each of the Edinburgh, North British Review, and Blackwood, to the address of the "Mechanics' Institute," Nashville, Tenn.

One copy each of Blackwood and Chambers' Edinburgh Journal, to address of Saml. R. Morgan, Nashville Manufacturing Co., Nashville, Tenn.

The New York Observer for two years with the Missionary Atlas to my own address.

J. THOMPSON, Agt.

Nashville, Tenn.

MESSRS. MUNN & Co.—After waiting some time before writing you, in order to collect from some who subscribed before the decision of the prizes, I had 160 names. I thought your paper would be better than the money, so I have waited to collect, as it was not for the prize that I obtained subscribers, but for the *worth* of your paper, the prize money I divide equally with each subscriber. You will please send me a draft on New York for the balance of the money. You will please see to it that all the names I send you are correctly entered on your books, as one of the men told me that he would rather have the paper than $10. I shall continue to use my influence in favor of your valuable paper.

A. HAMMOND

Jacksonville, Ill.

Rejection of an Extension of a patent.

We understand that the Commissioner of Patents, has refused an extension of the patent of Henry Burden, of Troy, for making hook-headed spikes, on the grounds of an imperfect description, and want of novelty.

St. Peter's Church in Rome can hold 54,000 persons.

Calico Printing.

[Concluded from page 198.]

Another method of calico printing remains to be described, namely, press printing, by which several colors can be printed at once. The cloth to be printed is wound upon a roller at one end of a machine, and the design, which is formed in a block of mixed metal about two and a half feet square, is supported with its face downwards in an iron frame, and can be raised or lowered at pleasure. The face of the block is divided into as many stripes, ranging cross-ways with the table, as there are colors to be printed. If, for example, the pattern be made up of five stripes of different colors, and each stripe to be six inches broad, and as long as the breadth of the cloth, the colors have to be applied without mingling or interfering with each other. This is accomplished in the following manner:—The side edges of the table are furnished with a couple of rails similar to a railway, and upon this is a shallow tray or frame, capable of moving backwards and forwards upon wheels. Within this frame is a cushion of about the same size as the printing block, and by its side are four small troughs containing the thickened colors. By means of a long piece of wood, formed so as to dip into all the troughs at once, the tearer applies a small portion of each color to the surface of the cushion, and spreads them evenly into five portions or stripes, taking care not to mix them; but making their breadth equal to that of the stereotype rows on the block. The cushion being prepared, the frame is rolled along the railway until it is immediately under the printing-block, which the pressman then lowers upon the cushion, by which means the five stripes of the block become charged, each with its proper color. The block is then raised, the frame rolled away, and the block brought down upon the cloth, which it prints with five rows of different colors. On raising the block, the cloth is drawn forward about six inches in the direction of its length, or exactly the width of one stripe on the block; the tearer again pushes forward the cushion with the colors renewed and the block is again charged and applied to the cloth. Now, as a length of the cloth equal to the width of a stripe is drawn from under the block at each impression, every part of the cloth is brought into contact with all the stripes on the block. Great care is required so to adjust all the moving parts of the press, that the colors may not mingle, and distort the pattern.

We have said nothing about the chemical nature of the art of Calico Printing, than which no one displays a more extensive or finer field for chemical research, and the application of chemical knowledge. Indeed, it is exceedingly exciting to the mind, and has tended to the development of very high mental qualities in some of England's greatest statesmen, and especially in her great Commoner, Robert Peel.

As an art it is divided into a number of branches, such as the *resist*, *discharge*, and *topical* styles, each one being quite different from the other.

Resist Style—Blue.—By printing any pattern on white cloth, with a certain paste, and then dyeing the cloth in a blue vat, the parts printed with the paste will come out white, and the parts not so printed will be blue. The following is the way to do this. A vat containing 150 gallons of water is charged with 30 lbs., of good indigo ground together finer than wheat flour, 40 lbs. of the sulphate of iron and 60 lbs. of flour quick-lime. These ingredients must be well stirred every two hours with a flat iron rake, for three days, before the vat is fit to be worked. The copperas and lime deprive the indigo of its oxygen, and it then gives out its color. This vat must be allowed to settle well before it is worked. The cloth to be dyed is printed with a paste made by dissolving 1½ lbs., of the sulphate of copper in one gallon of water with 8 lbs. of fine ground pipe-clay, to which is added some dissolved gum-tragacanth, arabic, or British. This paste having been printed by blocks, or rollers on the goods, and dried, they are taken and placed on a frame, and cautiously let down into the blue vat, then made to move carefully on rollers up and down, so as to expose them to the air; they may also get dips in several vats—always ending with the strongest. When they are of the proper shade of color, they are taken out and run through a very weak solution of sulphuric acid, and well washed in cold water afterwards. The figures printed with the paste will be white, and the rest will be blue.

Another variety of the style may be produced by mixing some acetate, or subnitrate of lead with the above paste, and after the goods are dyed, and well washed, they are passed slowly through a hot solution, at 24 degs. strength, of the bi-chromate of potash, then through a weak solution of acetate of lead, and afterwards washed. The figures printed with the paste will then be yellow, and the ground blue, or if instead of running the goods lastly through a solution of the acetate of lead, they are passed through hot lime water, they (the yellow figures) will become an orange color. We have thus described the methods of producing white and blue, yellow and blue, and orange and blue calicoes. By printing different pastes, on the cloth, a great number of colors can afterwards be dyed in them, and still there may be white flowers in the pattern.

The madder resist style it another branch of the art, but we will proceed to that of the "discharge style." This consists in discharging the color by figured blocks, from plain pieces of goods. This is all done by presses. The cloth to be discharged is pressed very firmly between large leaden blocks, which have the pattern so cut in them that the parts not to be discharged are so firmly squeezed that none of the discharge liquor (which is strong chloride of lime, the chlorine being set free by sulphuric acid) will touch them, while the parts to be discharged of color are allowed to come in contact with the liquor. Turkey-red goods are the kind on which this branch of the art is practiced. It has been carried to the greatest perfection at the Works of Sir Henry Monteath, near the City of Glasgow. Many men have lost their lives working at this unhealthy business.

Topical Style—This style consists in printing the colors at once on the cloth, like paint, but still the colors are very different from paint, as many of them, when printed on the cloth, have to be submitted to a steam bath, in order to fix them, and in this manner calico printing differs entirely from that of oil-cloth printing, the colors of the latter lie on the surface, those of the former must combine with the fibre of the cloth, and become something like a part of the cloth itself. The difference between a fast and a fugitive color in calicoes, simply consists in the quality of the color as related to the cloth. The color which is the most insoluble in water and soap, and withstands sunlight best, is the fastest; that which is the easiest affected with washing or sunlight is the most fugitive.

Tapestry carpets are calico prints, in a certain sense; their warps are printed by rollers on large drums, and the yarn so printed, according to a registered pattern, is afterwards spooled, warped out, and beamed in such a manner, that the pattern is formed in the warp, the weft being merely woven in like plain work; the warp which is raised by the wires, shows the pattern which was printed by rollers. The colors are all steamed (like some of those on calicoes) after they are printed.

We do not see why carpets may not be printed to look as well as those which are woven. Two patents have been taken out for printing them on both sides, and it may be that they will yet be printed, by rollers, on both sides at one continuous operation. We think this possible—it is at least worthy of an effort. A press might be made with a succession of pattern cylinders, to print the pattern on one side, and a succession of pattern rollers may print a different pattern on the other side, and then the whole piece may be run into a steam room to raise and set the colors. This may yet be accomplished. Such an invention would revolutionize the whole art of carpet manufacturing.

We have no statistics at hand to give full and correct information respecting the number of calico printworks in the United States, and their history, but there are quite a number of them, and some not a little famous for their styles of goods. The Printworks at Lowell, Mass., Fall River, Conn., Providence, R. I., Lodi, N. J., and Frankfort, Pa., are known far and near. Massachusetts is the great calico State, however. In 1845 there were 14 printworks in it (6 being in Middlesex Co.,) employing 2,053 persons, with a capital invested, of $1,401,500, and producing 40,855,818 yards, valued at $4,779,817. There are some styles of printing which have not yet been introduced into our country, such as the fine muslin and turkey red styles. Our calicoes are principally of the coarser qualities; the finer are all imported mostly from France, at least they are all sold under French titles, a very good evidence of the character of French calicoes. It was attempted, we believe, to establish Turkey-red dyeing by Joseph Marshall, at Hudson, N. Y., some years before he died, but the effort failed of success. At the present moment there are colors sold for Turkey reds, which are just as like that beautiful color as a brown is to a clear bright scarlet, and indeed at the present prices of goods, it is not possible to produce such fabrics in our country, as they can be bought for 18 cents per yard by the piece, while the dusky red barwoods cost 12 cents. The calicoes manufactured at Merrimac have long been famous for their permanent colors; they are mostly produced from madder; but as a general thing they do not exhibit that beauty of pattern and design peculiar to the French calicoes, or even those of Switzerland and Britain, and it is even admitted that the designs of the British calicoes of the present day are not equal to those which were produced 50 years ago, because the calico printers find it to their profit to copy from the French. The person who conducts a calico printfield, should be a man of great chemical information, have a fine taste for the harmony of colors, and the grouping of forms, and have his head well filled with a knowledge of machinery.

American Coal Statistics.

The following statistics from the Pottsville "Mining Journal" are of deep interest to all those who use coal as fuel for manufacturing purposes, or domestic use:—

The Journal says:—"The consumption of coal does not increase as rapidly as was supposed. In 1852, the increase was less than 13 per cent., and left a surplus in the market.—In 1853, the increased supply was less than 9 per cent., from all sources. To this of course is to be attributed the high price of coal during the latter part of the year—but taking the average over 12 per cent., it will reach it. We see no good reason to believe that this average per centage in the demand is likely to be exceeded the present year, which would require an increase in the supply of about 623,000 tons, in 1854, from all sources, to keep the market healthy.

This increased supply can easily be furnished by the different regions, provided dealers and customers will come forward and take coal early in the spring.

The same paper gives the following summary of operations in Schuylkill county:

Total number of collieries	113
Red Ash, do.	58
White Ash, do.	55
Number of operators, ...	82
Employed at collieries, ...	9,792
Miners' houses out of towns, . . .	2,756
Whole capital invested in these collieries, ...	$3,462,000
By individual operators, about .	2,600,000
Thickest vein, worked at Heckscherville, (feet)	80
Smallest, ...	2

All the coal lands now worked in Schuylkill county are owned by six corporations and about sixty individuals. About twenty-five of the owners reside in Schuylkull county, and the balance abroad. The coal rent will average about 30 cts. a ton. The product of 1853, in Schuylkill county, was 2,551,603 tons. This would give an income of $765,480 to the landholders, in the shape of rents, for the year."

American Wool.

The British Commissioners of the great exhibition of 1851, have determined to form, in London, a grand universal trade museum. Mr. Solby, their agent, has applied to Mr. P. A. Browne, of Philadelphia, to ascertain how they will be able to procure for it all the leading varieties of the best American fleece; and Mr. Browne has recommended this direct appeal in their behalf, to the sheep-breeders and woolgrowers of the United States.

Any one disposed to countenance this laudable design will be pleased, with as little delay as possible, to forward specimens to Mr. Browne post-paid.

Each sample ought to be accompanied with the name and address of the donor, and also, of the breeder, where he is not the owner; the name of the species, variety, or breed of both parents or ancestors of the animal from which the specimen is taken; the age, sex, probable weight, and amount and date of the last clip; and the number of the flock to which he belongs, &c. All specimens, when practicable, should be drawn out, (not cut,) and be taken from the back, six inches in the rear of the neck.

[The above is from the Philadelphia Ledger; we heartily recommend the subject to the attention of our farmers who have sheep, many of whom are readers of the "Scientific American.

American Steamboats on the Amazon River.

A letter addressed to the Boston "Traveller," dated Para, South America, December 22, 1853, gives an account of the trial trip of Dr. Whitmore's new steamers, designed to navigate the river Amazon. Some time ago he took a contract from the Peruvian government, to furnish two or more steamboats suitable for the navigation of the Amazon, a treaty having been made with Brazil with this end in view. Dr. Whitmore came to New York, contracted for the boats and machinery, superintended their construction, had them taken to pieces and packed in a sailing vessel and shipped for the mouth of the Amazon; all at his own hazard. He then secured a sufficient number of competent mechanics to go out with him, to put the steamers together, and set up their machinery, and on the day of the date of the letter, the enterprise had been so far crowned with success, that the first of these little river boats had made its trip, and appeared off Para, some seventy miles from the mouth of the Amazon.

It was a gala day. The city was astir with joyful anticipations; and the little steamer was received with every demonstration of satisfaction. She was decked with flags, among which the stars and stripes were conspicuous, and bore a gladsome company, some two hundred persons.

Scientific Darkness.

"A very remarkable discovery was announced to the Academy of Sciences by M. Dumas in its last sitting. He stated that M. Saint-Clair Deville had succeeded in obtaining from clay a metal as white and brilliant as silver, as malleable as gold, and as light as glass. It is fusible at a moderate temperature. Air and damp do not affect this metal, which is called alumini-um; it retains its brilliancy, and is not affected by nitric or sulphuric acid, either strong or diluted, if the temperature be not raised. Several specimens of this metal were exhibited to the Academy, and, on the proposition of Baron Thenard, it was voted unanimously that a sufficient sum should be placed at the disposal of M. Saint-Clair Deville to enable him to make experiments on a large scale."

[The above is from the Paris correspondent of the "New York Daily Times" of the 27th ult., and really exhibits an amount of ignorance quite surprising in this age of light and intelligence. The basis of all clays have been long known to be a metal named aluminum, and although it has some qualities different from those ascribed to it above, still the metal itself is no new discovery. It was suspected to be a metal by Sir H. Davy, and proved to be one by Wohler. The above-named French chemist may have discovered some new properties of this metal, and the correspondent being ignorant of what these were, jumbled up the whole mess as above. Such news from Paris may be very edifying to some kinds of readers, but would not be to those of the Scientific American.

The Province of Nova Scotia appears to be in a very prosperous state. Only six States in the Union surpass it for ship-building.

TO CORRESPONDENTS.

C. J. F., of Ohio—Your sail will not have the same pressure upon each square inch of canvas as the ordinary one. The pressure depends upon the vertical area of the portion of the current of air intercepted. You had better consult a nautical man as to the practicability of rigging a ship on your plan; a patent could be probably obtained, but we think it of doubtful utility.

E. W. D., of Ct.—Have you ever paid strict attention to the formation of "anchor ice:" we know that ice is oftentimes found on the bottoms of rapid shallow rivers, and have seen it often, but we want positive information respecting the mode of its formation.

B. F. W., of N. Y.—There is no particular work which treats exclusively of the high pressure engine.

T. S. P., of Pa.—There is no great danger of an explosion from the water getting below the fire line, excepting from the weakening of the metal by over-heating, whereby it is easily torn asunder by a very limited pressure of steam.

J. L., of N. C.—We really could not give you the information desired about the price of machinery, the number of hands necessary, and an account of the method of conducting the business, or we should be happy to do so; we have never been engaged in the business to know all these particulars; we know how the manufacture is conducted, and that is all—no small affair either.

J. T. G., of Ky.—By placing your two 18 feet boilers end to end, you would not be able to raise the same quantity of steam in the same time as by having two furnaces. It has been found that boilers of four times the length of the fire are as economical as any other kind, that is, for coal; if you burn wood they should be longer—as long as the length of flame, whatever that may be.

O. K., of Pa.—Some two or three years since we remember a patent issued that covered the same improvement in reapers as you describe. The name of the patentee we have endeavored unsuccessfully to recall to mind.

F. A., of Warsaw—Matrasses for ships, &c., have been made of tubes of india rubber, granulated corks, and other substances; we cannot discover any patentable feature in yours; it would not be patentable to increase their size—any one would have a right to do this.

W. C. H., of Mass.—The wet process is the best for purifying gas—the purifyer should be well agitated.

W. G., of Va.—A patent could not be obtained for using a platinum gauze cylinder in burning gas made from wood.

S. M., of Me.—Yours will appear in due season, but this is not a proper time for it.

A. S., of New York.—We have published receipts for gum arabic paste; it is so simple to make that any person can do so without instructions by simply dissolving the gum in water.

L. W. J. & J. E., of Iowa—We have never seen cast-steel soldered with soft solder; we think it may be done.

D. W. R., of Conn.—Compressed air has been used for many engines, but yours may be different from other plans; the patent fee of government is $30.

H. L. H., of B——.—The patent could not be obtained for the quality of leather produced, but the process. The best solution you can use to stand the heat is an aluminous one.

T. J. B., of Mass.—You will see a recipe for tempering steel in another column.

J. V. S., of N. Y.—The best work on railroads and locomotives is Mr. Clarke's, price 62 1-2 cents per number; sold by Blackie & Son, Fulton street, N. Y.

G. R., of N. Y.—We have never seen the phenomenon you speak of, and do not know but your views may be correct.

T. L., of Ohio—You are right about the Marine Hog. The pitch between the parallel of the two pulleys need not be over one inch: but this depends in a measure on the weight of the belting. There is a great diversity of opinions about belting.

H. R., of N. Y.—We give every one of our readers all the reasonable information we consistently can without fee or reward.

S. T., of Ohio—We can give you the receipe for making the fluid which you speak of, but you will find it on page 213, Vol. 8, Sci. Am. We can also give you the recipe for the varnish, but you can also find one that will answer in No. 21, this volume.

L. R., of N. Y.—We have no idea of any power independent of motion.

D. H., of Boston—We laid aside the letter, of F., of Ind., and do not know where to find it now.

P. R., of L. I.—Your plan of injecting the matter to prevent incrustations we think will answer very well.

J. C. T., of Mass.—We published a good receipt for browning gun barrels in Vol. 6, Sci. Am. We can send you the method if you want it.

J. G., of Conn.—We could give you the information, but it would be far better for you to go into a bindery and see the operation.

H. C., of La.—You know your case best; the common rules are very simple.

W. B., of Mo.—Do not use high pressure steam for bending timber, let it be low pressure: seven lbs. pressure is sufficient, and for some specimens it may be necessary to boil them in water.

A. S. M., of Ohio.—Your plan can never be made available. It was tried a few years ago on the Hudson River.

F. R. B., of N. Y.—A water wheel constructed on the principle you describe is not new. We know of many substantially the same. Any screw wheel is on the same principle.

N. S. K., of N. Y.—A universal joint in a propeller shaft are not new. We cannot tell whether the peculiar shape of the blade is patentable until we know what it is.

J. D. H., of N. Y.—When you write to any one in future don't neglect to sign your name to your communication. Send us one of your improved matchboxes for examination, and we will write you our opinion on its receipt with your proper address.

D. J., of Pa.—Your plan for ventilating cars by placing a fan blower in front of the locomotive for forcing air through tubes is not new.

J. C., of Meiford.—If you had given us the State in which you reside, your letter of the 25th ult. would have been answered by mail immediately upon its receipt. The device for keying up floors, etc., is new, we think, and you had better send us a model.

T. S. J., of Ohio.—You will see an article in this number on the preparation of lead for pencils. There surely must be some works in our country for twisting augers by machinery, but all we have seen have been done by hand.

R. B. Jr., of N. H.—The form of the spindle is not a new idea for the hull of a vessel, and we can best answer most of your other questions by saying it will never answer. Such a vessel would roll too much. The method of securing the sheathing without exposing the nail heads may be valuable and patentable, if it will answer as well.

M. K., of Ind.—Build a brick kiln and burn your lime in it. See an illustrated plan for constructing kilns, on page 24, this Vol., Scientific American.

J. E. P., of Philadelphia.—The extract to which you refer was taken from a foreign journal.

J. C., of Vt.—We believe that the composition for preventing incrustations in boilers may be introduced through the feed pipe—try it.

W. S., of N. Y.—Your plan of atmospheric railroad propulsion is not new; it is the same as that for which Ira Avery, of Pennsylvania, obtained a patent some years ago.

Money received on account of Patent Office business for the week ending Saturday, March 4:—

A. G., of N. Y., $35; H. L. T., of N. Y., $50; J. B. S., of Wis., $30; R. V. DeG., of N. Y., $10: N. W. R., of N. Y., $50; S. N. & W. F. S., of N. Y., $25; J. C. R., of Ind., $30; W. D., of N. Y., $45; C. B., of N. Y., $30: J. S. T., of Ct., $30: F. M. H., of O., $25: P. Z. F., of R. I., $30; T. M. P., of Md., $30: G. H., of R. I., $25: H. G. B., of Mich., $25; H. W. P. & Co., of N. Y., $30; T. J. H., of N. Y., $30; W. T., of Ct., $30; J. McM., of Ky., $40: W. W., of Ill., $55; G. M., of Ill., $20; M. C. B., of N. H., $15; B. E. P., of Me., $64; H. E. P., of S. C., $55; A. C. M., of Ind., $10: H. O. P., of N. Y., $30; J. H. K., of N. Y., $25; S. B., of N. Y., $55; P. A., of N. Y., $12.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, March 4:—

P. S., of Ct.; N. W. R., of N. Y.: S. U. & W. F. S., of N. Y.; J. B., of O.; S. B. C., of Pa.; P. Z. F., of R. I.; F. M. H., of O.; H. E. C., of N. Y.; J. H. K., of N. Y.; G. H., of R. I.; H. G. B., of Mich: W. D. of N. Y.; S. B., of N. Y.

UNITED STATES PATENT OFFICE.
Washington, Feb. 16, 1854.

ON THE PETITION of Samuel F. B. Morse, of Poughkeepsie, New York, praying for the extension of a patent granted to him on the 20th of June, 1840, for an improvement in mode of communicating information by signals, by the application of electro-magnetism, for seven years from the expiration of said patent, which takes place on the 20th day of June, 1854—

It is ordered that the said petition be heard at the Patent Office, on Monday, 22nd day of May next, at 12 o'clock, M.; and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted.

Persons opposing the extension are required to file in the Patent Office their objections, specially set forth in writing, at least twenty days before the day of hearing. All testimony filed by either party, to be used at the said hearing, must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

Ordered, also, that this notice be published in the Union, Intelligencer and Evening Star, Washington, D. C.; Pensylvanian, Philadelphia, Pa.; Scientific American, New York; and Inquirer, Cincinnati, Ohio, once a week for three successive weeks previous to the 23d of April next, the day of hearing.

CHARLES MASON,
Commissioner of Patents.

P. S.—Editors of the above papers will please copy, and send their bills to the Patent Office, with a paper containing this notice. 26 3t

Scientific Museum.

The Barometer Outdone.

A correspondent of the "Philadelphia North American" gives an interesting description of an ingenious instrument, contrived by Dr. Merryweather of Yorkshire, Eng., the great working principle of which is founded on the sensitiveness of leeches to the changes of the weather. It is well known that leeches confined in a bottle partly filled with water, are accustomed, previous to a storm, to rouse from their sluggishness and exhibit signs of extraordinary perturbation. They will swim in all directions, and rising one after another to the top of the water, commence climbing the side of the bottle.—Availing himself of this time-honored custom among leeches, Dr. Merryweather arranged a number of bottles on a stand, each containing a leech and a metallic tube of a particular form, covered with shellac varnish, so that no metal could come in contact with the animal.—When a change in the weather was about to take place, the leeches would crawl into this metallic tube, and in so doing displace a small piece of whalebone which was arranged so as to partially close the opening. To this whalebone was attached a wire, which, passing upward through the mouth of the bottle, connected with the hammer of a bell, so that whenever the leeches were influenced by the electro-magnetic state of the atmosphere to ascend the tube, notice of the fact would be promptly transmitted to the ears of their master.

But it is not absolutely necessary that every one should have such a finished apparatus as that of Dr. Merryweather. On board of vessels it would only be necessary to keep a few leeches in a bottle, placed in some prominent place where the lookout could occasionally examine their movements, and the necessary warning be conveyed in ample time.

Dr. Merryweather seems to have tested his invention fairly. For an entire year (1850) he wrote to the president of the Philosophical Society of Whitby, accounts of the storm indications of his leeches; and in no instance did they prove incorrect. If these results are verified by other observations, a leech barometer may be deemed an indispensable appendage to every ship and every household.

The Niger and its Tributaries.

At a recent meeting of the Royal Geographical Society, London, a letter was read by Mc. Gregor Laird, stating that the screw steamer destined for the exploration of the Niger and Chadda rivers would be ready in March next, and would probably leave the mouth of the main branch of the Niger on her expedition up the river, about the first of July. She will be accompanied by three metallic sectional boats, fifty feet long, and eight feet beam, each manned by natives, so that in the event of any serious accident to the steamer, the adventurers may take to the boats. The party will comprise but ten or twelve Europeans, and these will all be men of education and resources.—The steamer's and boat's crews will consist of negroes, to the number of eighty or ninety. It is supposed that the steamer, which will be propelled by a screw, will attain a speed of ten knots, and leaving the coast with thirty days coal will reach the head of the navigable waters of the Chadda, without being obliged to stop for additional fuel.

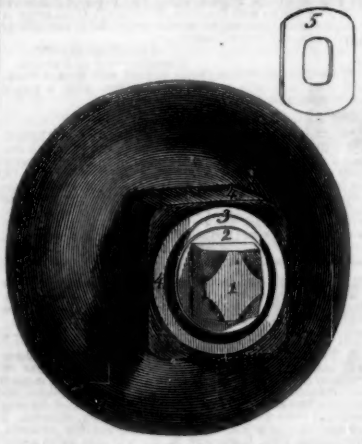
Bronze for the Sheathing of Ships.

M. Robierre, a chemist, at Nantes, who has studied the subject for years, has arrived, by experiments, at the following conclusion: that by diminishing the proportion of tin the oxydizable metal is less uniform in its distribution thorugh the plates, and there is a consequent inequality of alteration under the influence of seawater. His recent researches show that sheathing of bronze is preferable, as regards durability and solidity, to copper or brass. The abnormal altcrations which have been observed are due to defective manufacture. The presence of arsenic does not occasion alteration in this alloy, as happens for red copper. Bronze that will do good service contains in general 4-5 to 5-5 per cent. of tin; that with less, alters unequally. The introduction of a little zinc into these alloys of copper and tin, improves the product by favoring the diffusion of the positive constituent of the metallic mass.

Greaves' Nut Protector.

The annexed engraving is an illustration of a Nut Protector, invented by James Greaves, of Utica, N. Y., the object of which is to prevent the nuts from coming off the skeins of wagons.

1 is the bolt fastening the skein to the axle; 2 is a round washer, and 3 a washer of peculiar shape seen at 5; 4 is the nut.



After the bolt and nut have been screwed to their places, the washer, 3, is shoved up as represented in the cut, and the bolt, 1 screwed tight. This washer thus projecting prevents the nut from unscrewing and working off the axle. This plan will be readily understood without further description, is simple and cheap and we should think if properly carried out it might be efficient.

Any further information can be obtained of the inventor as above.

Agriculture by Steam.

The general application of steam to mechanical purposes has in a certain sense revolutionized the world. While nearly all the branches of labor and the arts have been benefitted by it, it is a singular fact that the powers of steam have never hitherto been practically applied to lighten the labors and ensure the success of the agriculturalist. The prospects are, however, that this deficiency will soon be removed. It is said that Mr. Romaine, of Peterborough, Upper Canada, has invented a steam plow, for which a patent has been granted in England, and which is said to be far superior to anything of the kind ever before constructed or conceived. It comprises a stout car, drawn by horses, containing a steam engine of ten horse power, with tubular boiler, on the principle of the locomotive engine, and connecting by means of a crank and rods with a large cylinder, suspended behind and supported by two smaller wheels, so as to be independent of the unequal motion of the horses. This cylinder is six feet in length and three in diameter, and is armed with projecting iron prongs which are so arranged in spiral position that upon the revolving of the cylinder they turn up and effectually pulverise the earth to any required depth. The cylinder is partly enclosed at the back by a box, against which the earth is thrown, and on the top is a seed roller, with tubes through which the seed is deposited in rows, and a roller following after leaves all smooth and complete.

The weight of the entire apparatus is about a tun and a half; but the labor of the horse is rendered comparatively light by that of the steam engine, which indeed leaves little for the horses to do but to guide the direction. It is believed that this machine, with the aid of a man and boy, would plow, sow and roll ten acres of land in a day. The first cost of the apparatus would be considerable; but the steam engine may be applied to thrashing and various other farm purposes, so that it would in the end materially lessen expenses.—[Boston Journal.

[We believe, that many years must pass away before steam power can be used economically in the field for plowing, in our country. It is a question of profit and loss, and the ballance must be struck in favor of horses for field work. Excepting upon smooth roads, such as railroads, it is not possible to use movable steam engines economically. Just think of drawing a steam plow weighing 1½ tuns over a rough field for ten hours every day; the idea is not very encouraging. A steam engine can only propel itself by rolling or pushing its wheels forward; this certainly, is no easy task on soft lands. Plows should be made light, strong, and as sharp as possible in the cutting parts: many farmers make sad blunders, by using dull colters, and blunt plow points.—Every pound added to the weight of a plow, increases the labor of the horses; therefore, the lighter a plow is so that it can retain its position in the soil, so much the better for man and beast.

Beverage Preparations.

PARAGUAY TEA—A decoction of the leaves of "Ilex Paraguayensis" is used in South America as a beverage, in place of tea and coffee, and hence its vulgar name of "Paraguay tea." According to Stenhouse and Rochleder (Ann. der Chem. und Pharm. lxvi.) its crystalline principle is identical with caffein, and its acid gives the same reactions as coffeo-tannic acid.

CHICORY COFFEE.—This article, originally manufactured in Holland, a century since, was first made in France in 1801, by Orban and Giraud. Since then, it has become an important object of commerce. It is used alone, or mixed with coffee, to which it imparts a bitter taste, and at the same time, it is said, modifying its stimulant action. It is frequently adulterated with coffee-grounds, brick-dust, earthy matters, roasted acorns, corn, haricots, and peas. Of these fraudulent mixtures, those containing starch may be detected by means of iodine-water. The coffee-grounds are recognised by throwing a pinch of the suspected chicory, previously dried, over a water-bath, upon the surface of water; the chicory absorbs water and sinks, the coffee-grounds floats.

The mode of preparing chicory coffee is, to collect the plant in the spring, and to strip and wash the roots. These roots are then divided into longitudinal strips, which are in turn still further reduced in size by being cut transversly, and dried in a heated chamber. The drying is facilitated by frequent stirring, and the root thus prepared takes the name of cossetes.—After roasting in cylinders, 2 per cent. of butter is added and the machine rotated several times, in order to give lustre and the appearance of coffee to the chicory. Grinding between cylinders, sieving, and coloring complete the operation.

We do not know whether chicory is raised and prepared in any part of our country for home consumption, but we know that a great deal of it is imported from England—for the purpose of mixing it with ground coffee. It is scarcely possible to obtain ground coffee in New York without some admixture of chicory; those who wish to obtain it pure, must buy the beans and grind them for themselves. But those who use chicory with coffee prefer it to pure coffee, and we do not know but they are right in their preference—"The proof of the pudding is the eating of it."

Bread Equal to Pound Cake.

In Captain Mayne Reid's interesting book called "Young Voyagers," he speaks of the seeds found in a certain species of pines, and used by the Indians for food, and says:—

"Several species found in the mountains of North Mexico, and through those desert regions where hardly any other vegetation exists, have edible seeds upon which whole tribes of Indians subsist for many months in the year. The Spanish Americans call them pinon trees, but there are several species of them in different districts. The Indians parch the seeds, and sometimes pound them into a coarse meal, from which they bake a very palatable bread. This bread is often rendered more savory by mixing the meal with dried prairie crickets, a species of coleopterous insects—that is, insects with a crustaceous or shell-like covering over their wings—which are common in the desert wilds where these Indians dwell. Some prairie travellers have pronounced this singular mixture equal to the best pound cake.

Hardening Cast Steel for Cutting.

Kieser, of Issy, in Switzerland, prepares admirably hardened razors, penknives, &c., from English cast-steel by plunging the blades, at a dark cherry-red heat, into a bath made of 14 parts, by measure of yellow resin in fine powder, 2 parts fish oil, and 1 part hot melted tallow; they are then allowed to cool perfectly, and without wiping them, are reheated to a low red-heat, and immersed in water in the usual way of tempering such articles. The edge of the blade treated in this mannner is said to be very fine, and the hardening more uniformly done than by any other process.—[London Artisan.

Shipbuilding in Sunderland, Eng., and New York.

The following figures show the number of ships built at Sunderland and New York during the past year:—Sunderland: Ships, 153; tonnage, 68,735. New York: Ships, 88; tonnage, 46,479. The excess of vessels built at Sunderland over its transatlantic rival being 65 vessels, and 22,256 tons shipping, actually more than the entire ships built on the Wear in 1843.

[The above, is from one of our foreign exchanges. We had no idea that Sunderland was so extensively engaged in shipbuilding.

LITERARY NOTICES.

NEW WORK ON MEDICINE.—Lamport, Blakeman & Law, of this city, have recently published a new volume upon the Domestic Practice of Medicine, from the pen of Dr. Freligh, which is designed as a text book for the student, and is simplified and arranged for domestic use. It is not to be supposed that many families are likely to acquire so much knowledge or experience, as to be able with safety to attempt to grapple with acute and formidable diseases; but it seems to us that any intelligent family may learn how to treat judiciously all diseases and complaints of a milder character, and acquire such a knowledge of the laws of health as will be of inestimable advantage to them through life. Commanding, as Dr. Freligh's work does, the commendations of leading men in both medical schools, and familiar as he is with the theory and practice of both, it may be safely asserted that it is among the most valuable contributions which have been recently made to medical science. It is a 12mo. of over 500 pages, and is designed for the Homœopathic Practice.

PHILOSOPHY OF FRENCH PRONUNCIATION.—Is the title of a book issued by Newman & Ivison, 178 Fulton street, from the pen of G. H. Talbot, Prof. of French, Boston, Mass. We have not had the time to give this book the thorough examination we could wish, but from the high standing of its author we doubt not it is a valuable work.

"Frank Leslie's Gazette of Fashions," for March, has been received. Sold by booksellers generally. It is a very popular work with the ladies. Price 25 cents.